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2021

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Cocq , C , Granstedt , L , Lindgren , E & Lindgren , U 2021 , ' Digital Maps for Linguistic Diversity ' , Digital Humanities in the Nordic Countries , [Online event] , 21/10/2020 - 23/10/2020 pp. 224-229 .

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<http://hdl.handle.net/10138/332066>

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# Digital Maps for Linguistic Diversity

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**Abstract.** Documenting and analyzing how multilingualism materializes around us gives insights in the use, hierarchies and inclusions of languages in society. The visualization of these insights, however, is often challenging as characteristics of languages, their flows, movements etc. demand contextualization and clarifications that can be difficult to render on a visualization model such as a map. This paper discusses the challenges of visualization and the potentials of digital maps in Linguistic Landscape Studies. We suggest to include and integrate various layers of qualitative and quantitative data in order to strive for rendering the dynamism of language use.

**Keywords:** Linguistic Landscapes, Visualization, Multilingualism.

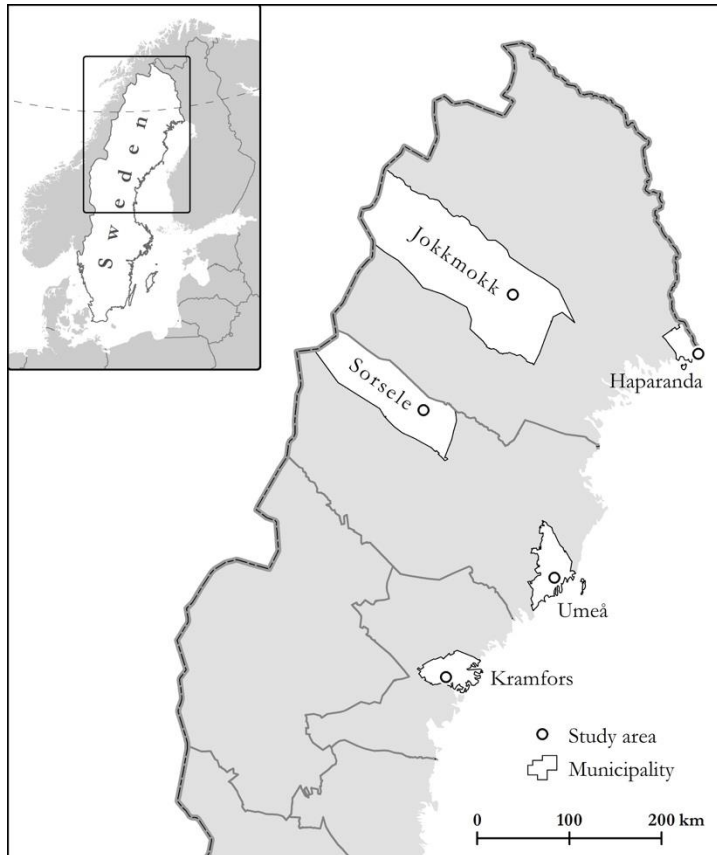
## 1 Introduction

Language maps have a central role in educational books, atlases, etc., illustrating pedagogical efforts toward a presentation of linguistic data. The characteristics of languages are however problematic to represent on a map: flows and movements as well as the lack of clear borders, for instance, demand contextualization and clarifications that can hardly be rendered. Language maps have therefore been criticized for being “generalized snapshots in time of a variable that is in constant change” [1; 2]. Given the central role of these maps in educational contexts, we ought to find more appropriate and accurate pedagogical modes for presenting linguistic data.

### 1.1 Linguistic Landscape Studies

The point of departure of this paper is a research project investigating linguistic landscapes – that is landscapes constructed by the combination of “road signs, advertising billboards, street names, place names, commercial shop signs, and public signs on government buildings” in a given “territory, region, or urban agglomeration” [3]. By studying which languages that materialize in urban public space, we can reach an understanding of the languages that are used and represented in society. These results reveal which languages are on display providing information about language discourses,

policy and power relations. More specifically, our project focuses on the representation of languages in five urban areas of northern Sweden, that reflect varying demographic and socioeconomic conditions.



**Fig. 1.** Study area of the project *The language of placemaking. A mixed-method analysis of linguistic landscapes*.

## 1.2 Digital Visualization

Digital mapping for visualization offers solutions for meeting the challenges of successfully representing linguistic diversity. One of digital humanities most valuable contributions is within the area of visualization. Visualization is in this context not only a mode to convey scientific results in graspable packages – it is also a way to raise new questions, make visible new patterns and causal relations between variables. Digital maps, more specifically deep maps [4;5], can combine complex layers based on various data sources, linked to different objects, which enable the user to interactively compare

these different layers. In terms of accessibility, analysis and display, Geographic Information Systems (GIS) allows for a greater flexibility in the use of data, which is one of the reasons why digital cartography is a growing field within visualization studies today [6;1;7].

Language maps have been criticized for being oversimplified [8], for failing to represent today's diverse linguistic environment and for embedding issues of power and perception, for instance with regard to cartographic decisions [2], and the implications of the representation of various groups of language speakers. Here, we would like to discuss digital forms of non-authoritative visualization that allow us to render the flows and dynamism of languages and language use.

## 2 Non-Authoritative and Dynamic Visualization

In order to find a mode of rendering the dynamism of multilingualism, we include various layers of data:

- Ethnographic data (fieldnotes, etc.)
- Socio-demographic data
- Vernacular signs (temporary signs, street art, stickers, etc.)
- Contextual information about the data collected

In a next step, we complement with additional data such as:

- Photos collected via crowdsourcing
- Social media data (collected at a specific time and place, for instance an event, a festival)

The vernacular and participatory dimensions of the datasets enable us to better grasp – and render – the varieties of uses and the dynamism of languages.

For instance, in June 2019 we conducted fieldwork in Kramfors (a small mid-Swedish city with 6800 inhabitants) and documented the city centre. On the one hand, the photo documentation reveals a strong dominance of monolingual signs in Swedish. On the other hand, our observations and interactions in different places of the city centre corroborate what is indicated by demographic data, i.e. that a relatively large part of the population has a non-Swedish origin (13.1% in 2018) and thereby other languages. The cultural and linguistic diversity is however not represented in the linguistic landscape of the city centre. Other data sources tell us that integration projects take place, for example projects organized by the Church of Sweden, Kramfors municipality, or some of the schools. In the next step of our project, we integrate the different datasets and investigate the dynamics of place-making process through language choice in urban public spaces.



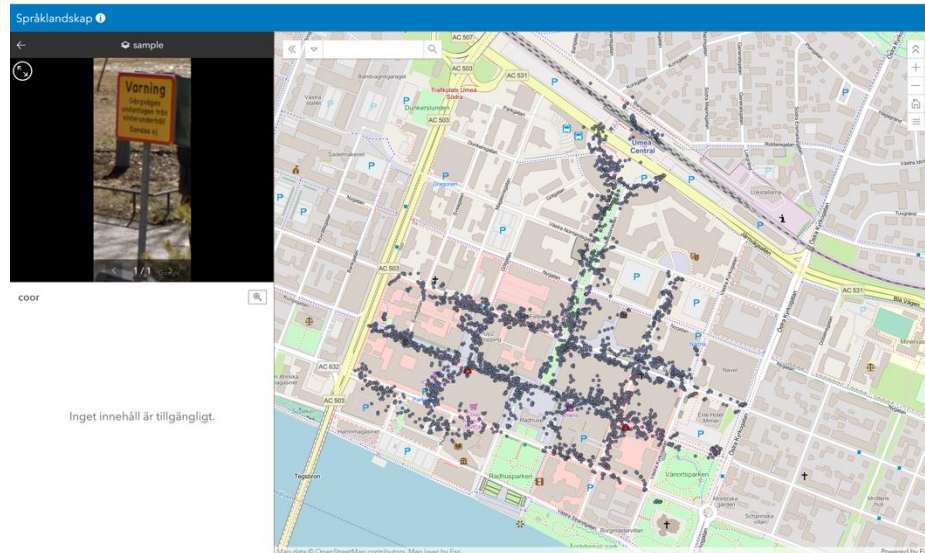
**Fig. 2.** Photo documentation during fieldwork in Kramfors, June 2019.

### **3 Mapping Languages – Benefits and Dilemmas**

A topographical exploration through a layering of different kinds of data enable us to map out the selected places and explore place-making processes. The digital map makes it possible to interactively construct complex layers based on data linked to the signs and to compare these different layers.

The first layer of data is constituted by the signs (photos), placed on a map revealing the main urban infrastructure. The photos are coded according to characteristics such as language, position, type of sign, author, addressee, fixed/mobile, the occurrence of several languages, etc., and placed geographically with filterable categories. The map is interactive, and the web-user can access detailed information on an image or a group of images intuitively, by clicking on an icon for the item (the image). This enables the user to navigate the landscape from a variety of perspectives, for instance, authors or languages.

The signs are presented as points on a digital map and linked to information about content and context. Fieldnotes and comments are to some extent included by using keywords. At this point, the representation that is created runs the risk to be quite static, which motivates the importance of the next step in the project that will include additional data collected via crowdsourcing and social media data.



**Fig. 3.** Map (prototype) showing the location of the documented signs (fieldwork in Umeå, Spring 2020).

One challenge in representation, besides this risk of being too static, is the limitations for embedding a large amount of data without affecting the user's experience when interacting with the map. As shown in Figure 3, in some cases the number of signs (the grey dots on the map) within a limited geographical area is abundant and makes the navigation “messy”. One way to reduce this messiness is to design a default mode when entering the map, that displays only multilingual signs. In the next step the user can filter in different ways through the above-mentioned categories. Within the framework of our project, this default mode is motivated by our focus on multilingualism. In other research contexts or for other purposes, the first map encountered by the web-user when entering the interface could display another selection, for instance, author or addressee.

Yet one challenge important to mention is the risk of reproducing the invisibility or poor representation of multilingualism and/or of certain languages. Therefore, an important layer of information to be added is the demographic register data that provides contextual information about the representation of languages in the population of each of the cities documented. This data is to be added to the map as infoboxes that appear directly when the web-user enters the municipality.

## 4 Conclusions

The type of visualization suggested here does not merely serve as a presentation or a methodological tool, but also as a means for knowledge communication concerning the presence of languages and their speakers. Thereby, with this approach we wish to contribute to an increased awareness of linguistic diversity and multilingualism – a step

towards enhanced understanding of place-making processes, the creation of inclusive public spaces, and reduced segregation.

## Acknowledgments

This paper is part of the research project The Language of Place-Making (2018-01528) funded by FORMAS The Swedish research council for sustainable development, 2019-2021 (University of Helsinki: Copp  lie Cocq; Ume   University: Lena Granstedt, Eva Lindgren, Urban Lindgren & Humlab)

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